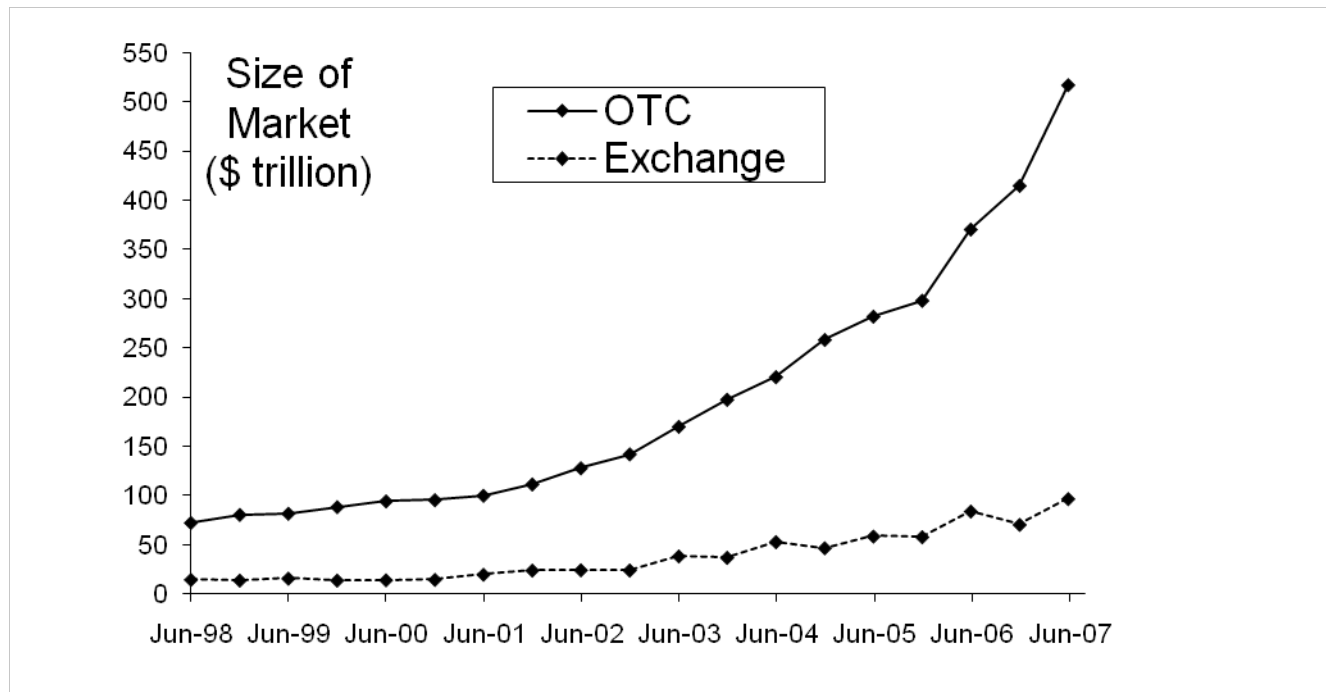


Introduction

Chapter 1

Size of OTC and Exchange-Traded Markets

(Figure 1.1, Page 3)



Source: Bank for International Settlements. Chart shows total principal amounts for OTC market and value of underlying assets for exchange market

Ways Derivatives are Used

- To hedge risks
- To speculate (take a view on the future direction of the market)
- To lock in an arbitrage profit
- To change the nature of a liability
- To change the nature of an investment without incurring the costs of selling one portfolio and buying another

Foreign Exchange Quotes for GBP, July 20, 2007 (See page 4)

	Bid	Offer
Spot	2.0558	2.0562
1-month forward	2.0547	2.0552
3-month forward	2.0526	2.0531
6-month forward	2.0483	2.0489

Forward Price

- The forward price for a contract is the delivery price that would be applicable to the contract if were negotiated today (i.e., it is the delivery price that would make the contract worth exactly zero)
- The forward price may be different for contracts of different maturities

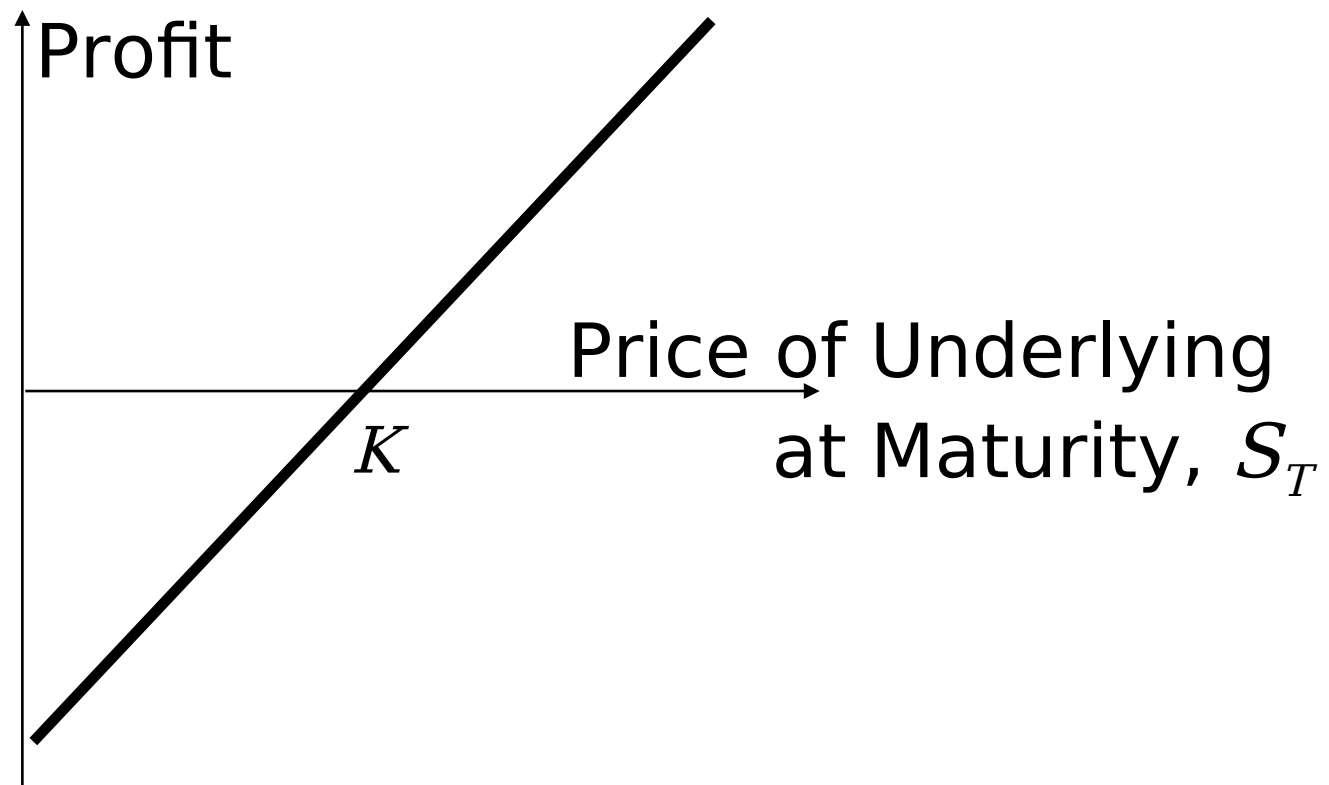
Terminology

- The party that has agreed to buy has what is termed a long position
- The party that has agreed to sell has what is termed a short position

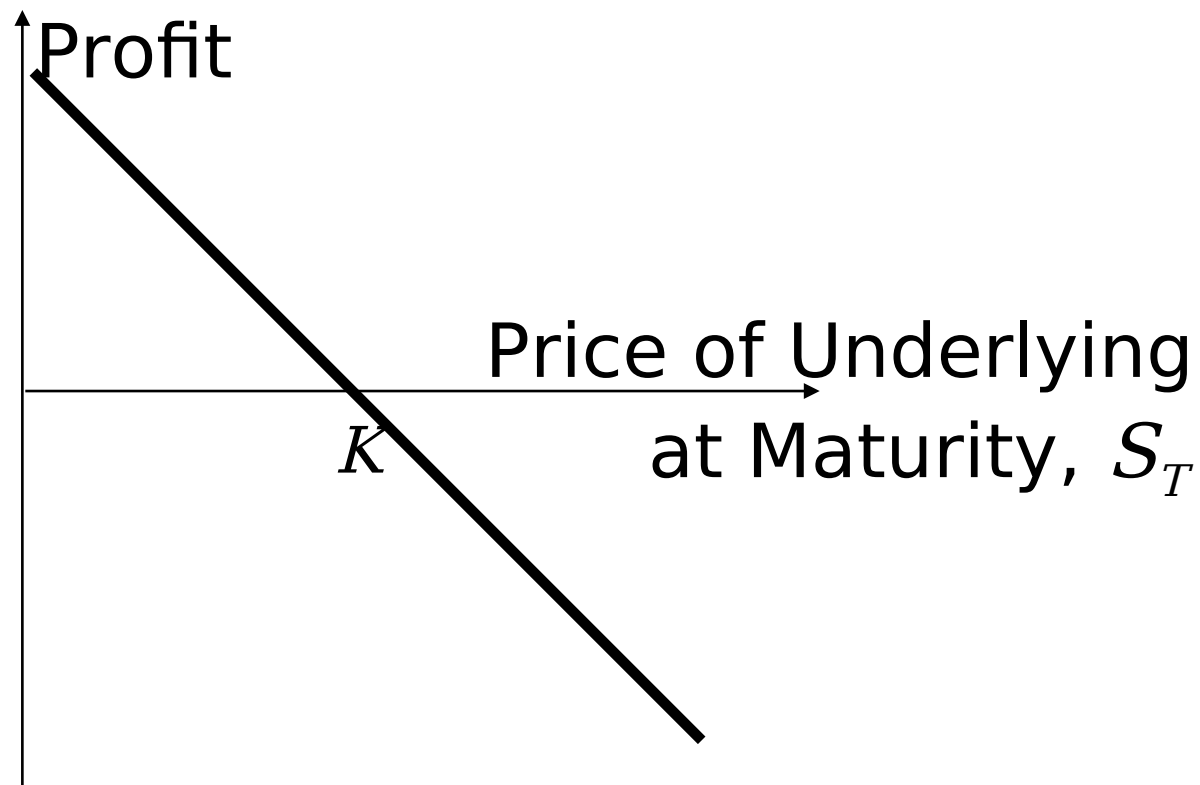
Example (page 4)

- On July 20, 2007 the treasurer of a corporation enters into a long forward contract to buy £1 million in six months at an exchange rate of 2.0489
- This obligates the corporation to pay \$2,048,900 for £1 million on January 20, 2008
- What are the possible outcomes?

Profit from a Long Forward Position



Profit from a Short Forward Position



Futures Contracts (page 6)

- Agreement to buy or sell an asset for a certain price at a certain time
- Similar to forward contract
- Whereas a forward contract is traded OTC, a futures contract is traded on an exchange

Exchanges Trading Futures

- Chicago Board of Trade
- Chicago Mercantile Exchange
- LIFFE (London)
- Eurex (Europe)
- BM&F (Sao Paulo, Brazil)
- TIFFE (Tokyo)
- and many more (see list at end of book)

Examples of Futures Contracts

Agreement to:

- Buy 100 oz. of gold @ US\$900/oz. in December (NYMEX)
- Sell £62,500 @ 2.0500 US\$/£ in March (CME)
- Sell 1,000 bbl. of oil @ US\$120/bbl. in April (NYMEX)

1. Gold: An Arbitrage Opportunity?

Suppose that:

The spot price of gold is US\$900

The 1-year forward price of gold is
US\$1,020

The 1-year US\$ interest rate is 5%
per annum

Is there an arbitrage opportunity?

2. Gold: Another Arbitrage Opportunity?

Suppose that:

- The spot price of gold is US\$900
- The 1-year forward price of gold is US\$900
- The 1-year US\$ interest rate is 5% per annum

Is there an arbitrage opportunity?

The Forward Price of Gold

If the spot price of gold is S and the forward price for a contract deliverable in T years is F , then

$$F = S(1+r)^T$$

where r is the 1-year (domestic currency) risk-free rate of interest.

In our examples, $S = 900$, $T = 1$, and $r = 0.05$ so that

$$F = 900(1+0.05) = 945$$

1. Oil: An Arbitrage Opportunity?

Suppose that:

- The spot price of oil is US\$95
- The quoted 1-year futures price of oil is US\$125
- The 1-year US\$ interest rate is 5% per annum
- The storage costs of oil are 2% per annum

Is there an arbitrage opportunity?

2. Oil: Another Arbitrage Opportunity?

Suppose that:

- The spot price of oil is US\$95
- The quoted 1-year futures price of oil is US\$80
- The 1-year US\$ interest rate is 5% per annum
- The storage costs of oil are 2% per annum

Is there an arbitrage opportunity?

Options

- A call option is an option to buy a certain asset by a certain date for a certain price (the strike price)
- A put option is an option to sell a certain asset by a certain date for a certain price (the strike price)

American vs European Options

- An American option can be exercised at any time during its life
- A European option can be exercised only at maturity

Intel Option Prices (Sept 12, 2006; Stock Price=19.56); See Table 1.2 page 7; Source: CBOE

Strike Price	Oct Call	Jan Call	Apr Call	Oct Put	Jan Put	Apr Put
15.00	4.650	4.950	5.150	0.025	0.150	0.275
17.50	2.300	2.775	3.150	0.125	0.475	0.725
20.00	0.575	1.175	1.650	0.875	1.375	1.700
22.50	0.075	0.375	0.725	2.950	3.100	3.300
25.00	0.025	0.125	0.275	5.450	5.450	5.450

Exchanges Trading Options

- Chicago Board Options Exchange
- American Stock Exchange
- Philadelphia Stock Exchange
- Pacific Exchange
- LIFFE (London)
- Eurex (Europe)
- and many more (see list at end of book)

Options vs Futures/Forwards

- A futures/forward contract gives the holder the obligation to buy or sell at a certain price
- An option gives the holder the right to buy or sell at a certain price

Types of Traders

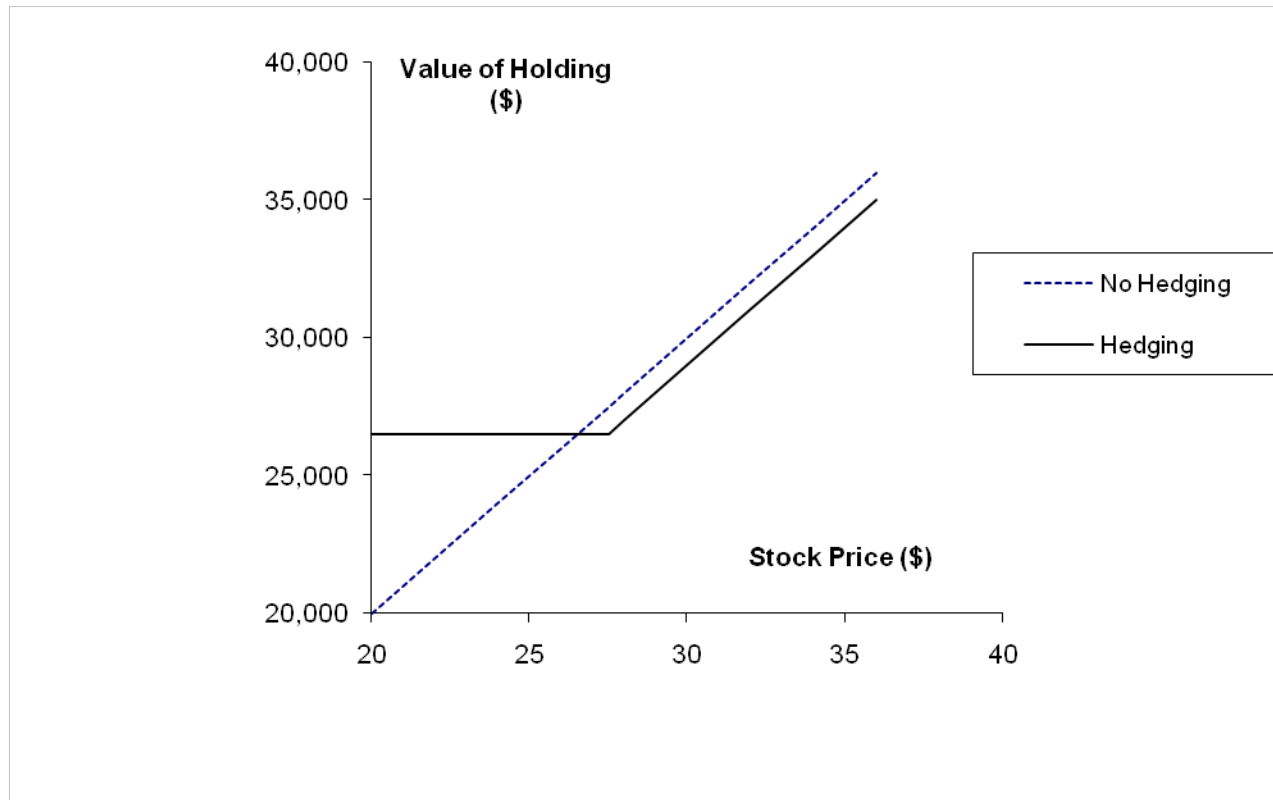
- Hedgers
- Speculators
- Arbitrageurs

Some of the largest trading losses in derivatives have occurred because individuals who had a mandate to be hedgers or arbitrageurs switched to being speculators (See for example Barings Bank, Business Snapshot 1.2, page 15)

Hedging Examples (pages 10-11)

- A US company will pay £10 million for imports from Britain in 3 months and decides to hedge using a long position in a forward contract
- An investor owns 1,000 Microsoft shares currently worth \$28 per share. A two-month put with a strike price of \$27.50 costs \$1. The investor decides to hedge by buying 10 contracts

Value of Microsoft Shares with and without Hedging (Fig 1.4, page 11)



Speculation Example

- An investor with \$2,000 to invest feels that a stock price will increase over the next 2 months. The current stock price is \$20 and the price of a 2-month call option with a strike of 22.50 is \$1
- What are the alternative strategies?

Arbitrage Example

- A stock price is quoted as £100 in London and \$200 in New York
- The current exchange rate is 2.0300
- What is the arbitrage opportunity?

Hedge Funds (see Business Snapshot 1.1, page 9)

- Hedge funds are not subject to the same rules as mutual funds and cannot offer their securities publicly.
- Mutual funds must
 - disclose investment policies,
 - makes shares redeemable at any time,
 - limit use of leverage
 - take no short positions.
- Hedge funds are not subject to these constraints.
- Hedge funds use complex trading strategies are big users of derivatives for hedging, speculation and arbitrage